

## Abstract

Field-deployable spatial positioning or measurement systems are provided for improved versatility, reliability and performance. The spatial positioning or measurement systems use rotating laser fans or beams for positioning and measuring and include a system integrated field-deployable length standard that uses a reelable tape with positional indents. The systems further include the use of labyrinth seals at interface volumes between rotating laser heads and transmitter assemblies to prevent ingress of contaminants and allow for elimination of the use of rotary seals. Further, new dynamic leveling techniques are provided to plumb positional laser transmitter systems. Still further, strobe beam configurations are provided for improved near/far performance and a vertical mode sensing scheme that allows switching to measuring tall structures when needed.